In the Claims

1-33. (Cancelled)

34. (Currently Amended) A magnetic resonance (MR) imaging apparatus comprising:

~~an (MR)~~ an MR imaging system having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field and an RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images; and

a computer programmed to:

sample non-spatially-encoded MR data of a central region of k-space from a region-of-interest (ROI) using any given k-space trajectory, wherein the non-spatially-encoded MR data is sampled during a repetition time interval of a pulse sequence;

sample spatially-encoded MR data from the ROI during the repetition time interval, wherein the spatially-encoded MR data comprises MR imaging data;

sample additional non-spatially-encoded MR data of the central region of k-space from the ROI; and

determine motion in the ROI based on MR motion data comprising the non-spatially-encoded MR data and the additional non-spatially-encoded MR data, wherein the MR motion data is free of MR imaging data.

35. (Previously Presented) The MR imaging apparatus of claim 34 wherein the central region of k-space comprises the center of k-space and a plurality of k-space points about the center of k-space.

36. (Previously Presented) The MR imaging apparatus of claim 34 wherein the computer is further programmed to:

determine a magnitude modulation among the non-spatially-encoded MR data and the additional non-spatially-encoded MR data; and

determine a gating signal based on the determination of the magnitude modulation to at least one of prospectively and retrospectively trigger a gated acquisition.

37. (Previously Presented) The MR imaging apparatus of claim 34 wherein the additional non-spatially-encoded MR data is sampled during the repetition time interval.

38. (Previously Presented) The MR imaging apparatus of claim 37 wherein the non-spatially-encoded MR data is sampled during the repetition time interval prior to the onset of a spatial encoding gradient to sample the spatially-encoded MR data, and wherein the additional non-spatially-encoded MR data is sampled after application of a rewinder pulse.

39. (Previously Presented) The MR imaging apparatus of claim 38 wherein the gated acquisition is at least one of a cardiac gated acquisition scheme and a respiratory gated acquisition scheme.

40. (Previously Presented) The MR imaging apparatus of claim 38 wherein the computer is further programmed to determine a modulation among the non-spatially-encoded MR data and the additional non-spatially-encoded MR data for the determination of the motion, wherein the modulation is at least one of a phase modulation and a magnitude modulation.

41. (Previously Presented) The MR imaging apparatus of claim 34 wherein the computer is further programmed to sample the additional non-spatially-encoded MR data during a repetition time interval subsequent to the repetition time interval in which the non-spatially-encoded MR data is sampled.

42. (Previously Presented) The MR imaging apparatus of claim 34 wherein the computer is further programmed to:

select an RF coil selected from the RF coil assembly that is most sensitive to the motion; and

sample the non-spatially-encoded MR data and the additional non-spatially-encoded MR data with only the selected RF coil.

43. (Previously Presented) The MR imaging apparatus of claim 34 wherein the non-spatially-encoded MR data, the additional non-spatially-encoded MR data, and the spatially-encoded MR data are sampled without subjecting a subject to breath-holding.

44. (Previously Presented) A computer readable storage medium having a computer program stored thereon, the computer program comprising a set of instructions that when executed by a computer cause the computer to:

acquire a first and a second set of central k-space magnetic resonance (MR) data from a region-of-interest (ROI) at a time other than during an application of frequency and phase encoding gradients, wherein at least the first set of central k-space MR data is acquired during a first repetition time of a pulse sequence;

acquire MR imaging data from the ROI during the first repetition time and during application of at least one of the frequency and phase encoding gradients;

assess motion in the ROI based on the first and second set of central k-space MR data, wherein the assessment of motion in the ROI is independent of the MR imaging data; and

reconstruct an MR image based on the assessment of motion.

45. (Previously Presented) The computer readable storage medium of claim 44 wherein the set of instructions cause the computer to acquire the second set of central k-space MR data during the first repetition time.

46. (Previously Presented) The computer readable storage medium of claim 44 wherein the set of instructions further cause the computer to correct at least one phase error in the MR imaging data based on the assessment of motion before reconstruction of the MR image.

47. (Previously Presented) The computer readable storage medium of claim 44 wherein the instructions that cause the computer to assess motion cause the computer to determine a DC fluctuation of at least one of a phase and magnitude among the first and second sets of central k-space data; and wherein the instructions further cause the computer to adjust a slice position based on the DC fluctuation.

48. (Previously Presented) A method of magnetic resonance (MR) imaging comprising:

sampling a central region of k-space associated with a region-of-interest (ROI) during a first repetition interval of a pulse sequence defined by an RF pulse using any k-space trajectory, wherein the sampling of the central region of k-space occurs prior to any application of

spatial-encoding gradients during the repetition time interval such that a first non-spatially encoded data set is obtained;

sampling spatially-encoded MR data from the ROI during the first repetition interval;

determining motion in the ROI based on MR motion data, wherein the MR motion data comprises the first non-spatially encoded data set from the central region of k-space, and wherein the MR motion data is free of spatially-encoded MR data; and

reconstructing an MR image based on the determination of motion in the ROI.

49. (Previously Presented) The method of claim 48 further comprising:

sampling the central region of k-space associated with the ROI during the first repetition interval using the any given k-space trajectory to obtain a second non-spatially encoded data set; and

wherein determining the motion in the ROI comprises assessing at least one of magnitude and phase fluctuations among the first non-spatially encoded data set and the second non-spatially encoded data set, wherein the MR motion data further comprises the second non-spatially-encoded data set.

50. (Previously Presented) The method of claim 48 further comprising sampling the central region of k-space associated with the ROI during a second repetition interval using the any given k-space trajectory to obtain a second non-spatially encoded data set, wherein the MR motion data further comprises the second non-spatially encoded data set.

51. (Previously Presented) The method of claim 50 wherein determining the motion in the ROI comprises assessing at least one of magnitude and phase fluctuations among the first non-spatially encoded data set and the second non-spatially encoded data set, wherein the MR motion data further comprises the second non-spatially-encoded data set.

52. (Previously Presented) The method of claim 48 further comprising realigning the spatially-encoded MR data prior to reconstructing the MR image.

53. (Previously Presented) The method of claim 48 further comprising gating additional samplings of spatially-encoded MR data based on magnitude fluctuations, wherein gating additional samplings comprises at least one of cardiac gating and respiratory gating.